THE JOURNAL OF EXPERIMENTAL BIOLOGY

EPITHELIAL AND CELLULAR MECHANISMS IN OSMOREGULATION

VOLUME 106

Based on a Discussion Meeting held in Wakulla Springs in March 1983, and organized by John Phillips and Simon Lewis

THE COMPANY OF BIOLOGISTS LIMITED

CAMBRIDGE

Published by The Company of Biologists Limited, Department of Zoology, University of Cambridge, Downing Street, Cambridge CB2 3EJ

© The Company of Biologists Limited 1983

Filmset by Filmtype Services Limited and Printed in England by Pindar Print Limited, Scarborough, North Yorkshire.

CONTENTS

PAGE

TREHERNE, J. E. Preface 1

PHILLIPS, JOHN AND LEWIS, SIMON. Introduction: trends in epithelial transport and control 3

LEWIS, SIMON A. Control of Na^+ and water absorption across vertebrate 'tight' epithelia by ADH and aldosterone 9

EPSTEIN, FRANKLIN H., STOFF, JEFFREY S. AND SILVA, PATRICIO. Mechanism and control of hyperosmotic NaCl-rich secretion by the rectal gland of *Squalus acanthias* 25

PALFREY, H. C. AND RAO, M. C. Na/K/Cl co-transport and its regulation 43

HANDLER, JOSEPH S. Use of cultured epithelia to study transport and its regulation 55

HANRAHAN, J. W. AND PHILLIPS, J. E. Cellular mechanisms and control of KCl absorption in insect hindgut 71

HARVEY, WILLIAM R., CIOFFI, MOIRA, DOW, JULIAN A. T. AND WOLFERSBERGER, MICHAEL G. Potassium ion transport ATPase in insect epithelia 91

RABON, E., CUPPOLETTI, J., MALINOWSKA, D., SMOLKA, A., HELANDER, H. F., MENDLEIN, J. AND SACHS, G. Proton secretion by the gastric parietal cell . . 119

AL-AWQATI, QAIS, GLUCK, STEPHEN, REEVES, WESTLEY AND CANNON, CHRISTOPHER. Regulation of proton transport in urinary epithelia 135

GERENCSER, GEORGE A. AND LEE, SOON-HO. Cl^--stimulated adenosine triphosphatase: existence, location and function 143

MURER, H., AHEARN, G., BIBER, J., CASSANO, G., GMAJ, P. AND STIEGER, B. Co- and counter-transport mechanisms in brush border membranes and basal-lateral membranes of intestine and kidney. 163

SPRING, KENNETH, R. Fluid transport by gallbladder epithelium 181

PODESTA, RON B. Syncytial epithelia: transport in the absence of paracellular pathways 195

CEREIJIDO, M., GONZÁLEZ-MARISCAL, L. AND BORBOA, L. Occluding junctions and paracellular pathways studied in monolayers of MDCK cells. 205

KOTTRA, GABOR AND FRÖMTER, EBERHARD. Functional properties of the paracellular pathway in some leaky epithelia 217

O'DONNELL, M. J. AND MADDRELL, S. H. P. Paracellular and transcellular routes for water and solute movements across insect epithelia 231

FOSKETT, J. KEVIN, BERN, HOWARD A., MACHEN, TERRY E. AND CONNER, MARILYN. Chloride cells and the hormonal control of teleost fish osmoregulation 255

PANG, PETER K. T. Evolution of control of epithelial transport in vertebrates . . . 283

Photographs of Meeting at Wakulla Springs 301